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ABSTRACT

Common educational curricula have been suggested to be advantageous in enhancing the stability of the community of nations. This paper describes a multinational curriculum design effort by four Pacific rim nations (Australia, Japan, New Zealand, and the United States) which has created a common curriculum program. This joint venture resulted in the production of the Pacific Ocean Fisheries (POF) project. Components of this project are reviewed in this paper. They include explanations of the project under the following categories: (1) rationale; (2) content of the materials developed (describing the local/national component and the generalizing/internal component); (3) unit organization (explaining the major emphasis of the four units); (4) curricular structure (suggesting multiple options for use); (5) materials development stages (reviewing efforts undertaken in the organization, local development, international development, and international component publication stages); (6) problems (discussing difficulties encountered in areas such as funding, content, communication, personnel, and language); and (7) ruminations and epilogue (evaluating the project's accomplishments and posing future directions). (ML)

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# PACIFIC OCEAN FISHERIES PROJECT
## A Study of International Cooperation in Curriculum Design

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It has been suggested that a nation is built out of the perceptions of its people and that a nation's stability can be measured by the degree to which those perceptions are shared and common. Extending this idea, the stability of a community of nations may possibly be measurable in terms of shared perceptions. Since many perceptions flow out of the schooling experience of youth, it follows that common educational curricula, taught in several nations, may enhance the stability within that community of nations. Certainly the common content of science has made it possible for scientists throughout the world to meet and share findings on a common ground of experience.

One method of gaining common curricula has been through adaptation. Adaptation of curricula produced in other countries is an established international practice. For the past forty years, translation, adaptation and modification of curricula, particularly in the areas of math and science have been a major task of universities and other centers of education worldwide. In addition, there are a smaller but significant number of bi-national development efforts especially in the areas of the social sciences where it has been felt that cultural, demographic, and historical factuality were of great importance.

Rare, however, are examples of multinational efforts to develop common curriculum. This is despite the fact that the pooling of intellectual, and material resources has many potential advantages including: 1) substantial per nation personnel cost reduction; 2) shortened research time on national and regional environmental, cultural, and political issues due to presence of national members with access to such data; 3) increased probability of accurate reflection of each contributing nation's cultural and political stance on problems and issues; 4) provision for a common experience in education for the children of the cooperating nations in pursuit of long term enhancement of international understanding and cooperation.

The experiment reported here is such a multinational curriculum design effort which has created a common curriculum through the joint work of four Pacific Rim nations, Australia, Japan, New Zealand, and the United States. The topic of Pacific fisheries is one of great technological and political import to all four nations. At this writing the common curricular product, Pacific Fisheries: Environments, Economics, Politics, and Cooperation is in publication.

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## ORIGINS

The secondary school Pacific Ocean Fisheries (POF) project, out of which this common product has been developed, is one of two projects of a larger curriculum design program called The Ocean Project (TOP). A companion project called the Bays and Harbours project is designed for elementary school. TOP began operations in 1981 as the first true multinational curriculum design enterprise of the Pacific Circle Consortium (PCC). The PCC in turn was instituted in 1976 as a program of the Center for Educational Research and Innovation (CERI) of the Organization for Economic Cooperation and Development (OECD). Charter members of PCC were the Curriculum Development Center (CDC) of Australia, the University of British Columbia of Canada, the National Institute for Educational Research (NIER) of Japan, The New Zealand Department of Education (NZDE), and the Curriculum Research and Development Group (CRDG) University of Hawaii, the East West Center (EWC) and the North West Regional Laboratory (NWRL) of the United States. During the ten years of its existence, PCC has added five more members to its ranks. It is the goal of PCC to promote international understanding through the improvement of teaching about the peoples, cultures, and environments of the Pacific. Mechanisms used to achieve this end are the sharing of ideas, resources, evaluational information and personnel in cooperative curriculum and educational support services.

## PROJECT RATIONALE

The Pacific Ocean Fisheries project grew out of conjunction of research and practical interests. Looking first at practicality, in 1981 curriculum development programs were in the offing in several of the institutions represented which were to include consideration of international fishing issues. It was agreed that in those constituencies of agencies where the demand for fishery materials had not yet emerged that the growing importance of the 200 mile exclusive economic zone would make such materials timely and welcome. Further, since the project would provide materials appropriate for both social studies and science programs with an environmental and technological thrust there would be a heightened probability of their utility.

From the beginning there was an interest in four categories of research questions inherent in the project. First, can the project be successfully completed and if so, what are the general and unique features of this multinational, cooperative, curriculum design enterprise. Second, what are the economic advantages or disadvantages of this cooperative effort and what generalizations can be made from the work. Third, to what extent can commonly developed materials be incorporated into the classroom operations of constituency schools. Fourth, when used will this curriculum affect students' perceptions of a need and possible means for achieving international cooperation in fisheries management?

With the publication of the fisheries materials, the project has gone from a problematic status to one of initial success and the latter part of this report will address the first and second categories of questions and attempt to generalize from the particulars of this project, suggesting mechanisms that may have applicability in other such projects. Third and fourth category questions must wait for several years of implementation.

## CONTENT OF MATERIALS

The Pacific Ocean Fisheries student materials are designed for the upper secondary school years 11 or 12 to be used in environmentally oriented social studies or science courses. They constitute a flexible set of units supporting four to sixteen weeks of instruction and are appropriate for the normal range of students found in the schools serviced by the agencies represented on the development team.

There are two major components to the materials: a local/national component and a generalizing/international component. Functionally, the local/national component provides students an awareness of conditions that they can immediately relate to. The generalizing/international component goes beyond local fisheries and discusses fisheries environments, problems, and issues that characterize the larger Pacific basin.

## UNIT ORGANIZATION

Materials are organized into four units:

Unit 1, "Fish Systems"
Unit 2, "Fish as a Resource"
Unit 3, "Conflict Over Resource Use"
Unit 4, "Fisheries Management"

In addition, some of the agencies have developed auxilliary material that compliment the basic units. To facilitate flexibility, the generalizing component provide a separate booklet to accompany each unit.

Unit 1, Fish Systems, provides students with an ecological study of the local and Pacific wide marine environments, the kinds of fisheries that have in the past and are now in operation, and environmental conditions that tend to enhance or reduce fisheries productivity. Through the use of case studies generalizing materials stress the similarities and differences of conditions found in the basin. A unique feature of the materials is the extensive use of systems diagrams starting in Unit 1 to give a pictorial bookkeeping tool to students to account for the numerous interacting factors in fisheries.

Unit 2, Fish As a Resource, focuses initially on the question of what is the nature of a resource and how fish gain resource status. It looks at nutritional, economic, religious, and aesthetic-recreational dimensions. With the dynamic status of resources established the Unit develops, through case studies, the technologies of harvesting, processing, and marketing fish. In particular it looks at the influence of economics on the exploitability of fish populations.

Unit 3, Conflicts Over Fish Resources, explores the range of problems that face fisheries as they compete for ocean space to carry out shore and maritime activities and rights to harvest organisms. Case studies deal with conflicts with other marine users, pollution, the 200-mile exclusive economic zone, international law and treaties, and the rights of indigenous peoples.

Unit 4, Fisheries Management, studies the history of fisheries management practices from ancient to modern times. It discusses the control mechanisms used by nations of the Pacific in regulating local and foreign fisheries interests as well as competing marine users. As a capstone, the implications of the United Nations' Law of the Sea Treaty are studied as an emerging force in international marine management.

Other Local Materials, were created by New Zealand and Alaska to reflect the particular problems of and management programs for fisheries in their region.

## STRUCTURE AND USE CURRICULUM

Because the materials must serve the need of several different national constituencies with different stances on teacher control of the curriculum, appropriate subject area of use, established commitments for subject matter coverage, and the student population to be served, the structure of the materials has to have maximum flexibility. Figure 1 shows the multiple options offered by the materials.

PACIFIC OCEAN FISHERIES

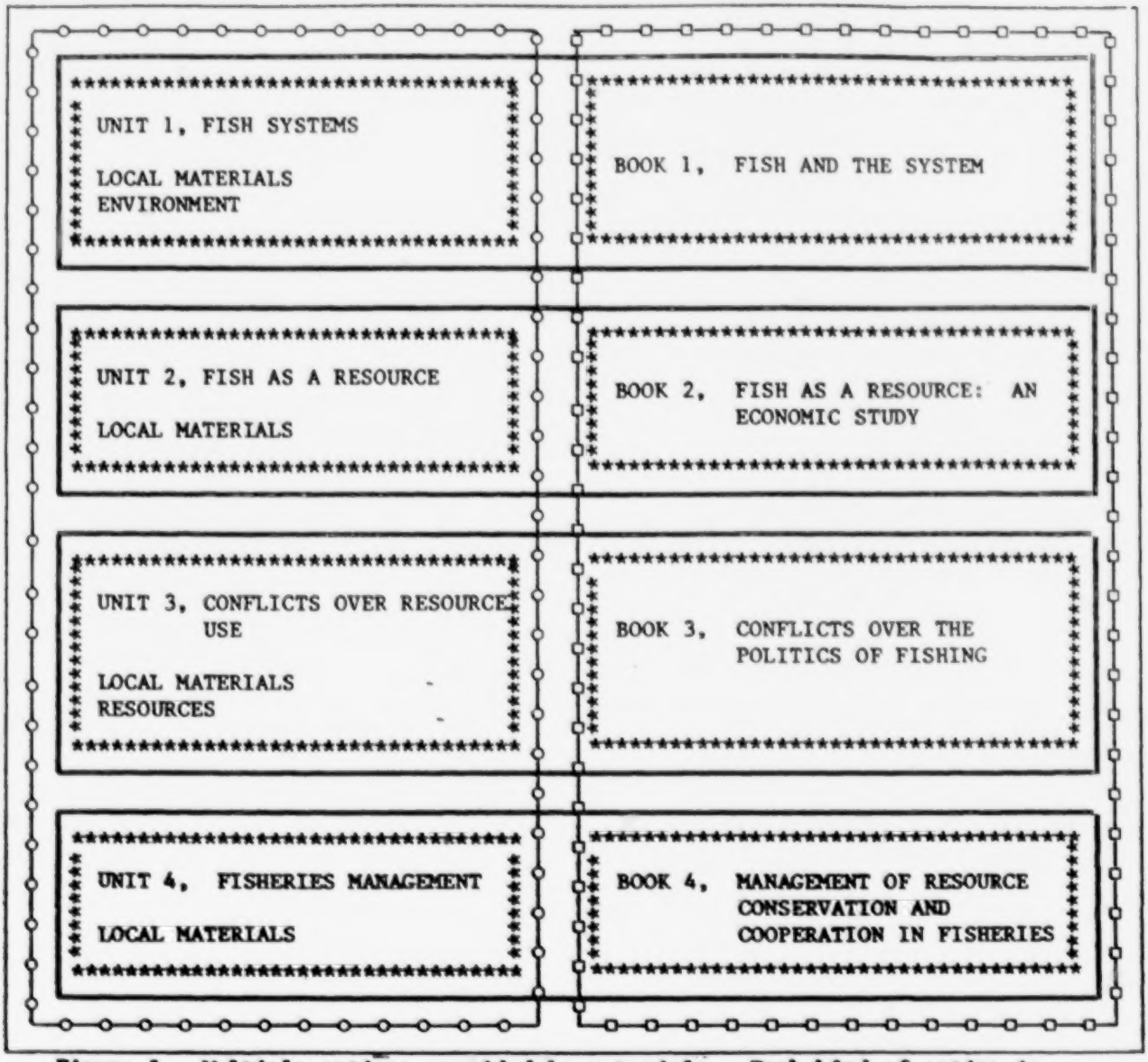
UNIT 1, FISH SYSTEMS
LOCAL MATERIALS
ENVIRONMENT
BOOK 1, FISH AND THE SYSTEM
UNIT 2, FISH AS A RESOURCE
LOCAL MATERIALS
BOOK 2, FISH AS A RESOURCE: AN ECONOMIC STUDY
UNIT 3, CONFLICTS OVER RESOURCE USE
LOCAL MATERIALS
RESOURCES
BOOK 3, CONFLICTS OVER THE POLITICS OF FISHING
UNIT 4, FISHERIES MANAGEMENT
LOCAL MATERIALS
BOOK 4, MANAGEMENT OF RESOURCE CONSERVATION AND COOPERATION IN FISHERIES

**Figure 1. Multiple options provided by materials. Each kind of option is shown by enclosing lines. The four books of the generalizing/international components are collectively called PACIFIC FISHERIES: ENVIRONMENTS, ECONOMICS, POLITICS, AND COOPERATION.**

——— **Total Curriculum (15-16 weeks of instruction)**
—o—o— **National Curriculum only (11-12 weeks of instruction)**
—o—o— **International Curriculum only (4-5 weeks of instruction)**
——— **Single Units (3-4 weeks of instruction)**
******* **Single National Units (2-3 weeks of instruction)**
******* **Single International Units (1 week of instruction)**

**Other options to those listed in the figure are open. For example a teacher could use local materials from the various countries in a comparative study. The intent of the project in giving an international perspective will be achieved when a teacher uses any option involving the**

## MATERIALS DEVELOPMENT

The work of the POF team has been done in 4 stages, the first the organizing stage, the second the local development stage, the third the international development stage, and the fourth the international component publication stage.

### The Organizing Stage

Preliminary conceptualization of possible environmental, ocean-oriented projects appropriate for primary and secondary schools began at the Christ Church, New Zealand meeting of the PCC in 1980. Those ideas helped shape the list of content consultants and primary and secondary developers who ultimately gathered at the East West Center in Honolulu, Hawaii in May of 1981 to undertake the creation of TOP's multinational curricula venture. The first Honolulu joint work session began with three days of presentations by content consultants who sketched in the problems and prospects of present and future use of the resources of the Pacific. In this intoxicating atmosphere of facts, projections, historical vignettes, and inspirational comments on the import of the task of curriculum development, the Pacific Ocean Fisheries project team drafted its first outline of content, general design parameters, and work commitments.

All of the curriculum centers respresented at the inaugural East West Center work session but one have continued with the project to the present. Initial centers are the Alaska Department of Education, the Australian Curriculum Development Center (CDC), the Hawaii Curriculum Research and Development Group (CRDG), Japan's Hiroshima University, the Northwest Regional Laboratory, and the New Zealand Department of Education. Though the Northwest Regional Laboratory did not continue as an institutional contributor, the three persons who were identified by the laboratory as developers continued to work as an independent team, subsidized in part by their employing agencies and CRDG. Those employing agencies were the Seattle Science Center, the Oregon State Department of Fisheries and Wild Life, and the Beaverton, Oregon School district.

### The Local Development Stage

During the next two years, 1981 through 1983, each of the teams concentrated on the development of materials that would reflect the condition of fishing in their local region. Out of this effort was produced a substantial body of materials that had local relevence and in many cases stood alone in satisfying immediate local school wants. Concurrent with this local thrust the beginnings of a generalizing component which would knit the local material into a larger Pan Pacific study of fishing problems and practices was drafted by the Hawaii Group. Products of this stage are now in print and include the "New Zealand Fisheries" text, by A. Boyce, D. Martin and B. Stringer, the "Alaska Fisheries" program developed under the leadership of T. Whitbeck, and the Japanese "Fisheries" materials developed under the direction of S. Takamura. In addition, a collection of fisheries materials reflecting the

Oregon and Washington region of the U.S. was compiled at the Seattle Science Center by A. Marrett, R. Duncan, and B. Hastie, while a similar work reflecting Hawaiian and broader Pacific concerns was compiled and tested by F. Pottenger and J. Shon.

## The International Development Stage

The period from 1984 to 1985, was devoted to the drafting of a common generalizing/international component and a computer simulation game PICES. Crafting of the generalizing component was done in four steps. Step one involved the joint selecting of content and compiling of prototype materials at the 1984 work session. This was followed by two rewrite sessions, one at the 1984 Brisbane, Australia meeting of PCC done by an editorial committee and another by an augmented editorial committee in Blenheim, New Zealand in January of 1985. After a trial testing of these materials yet another redraft was completed at the June 1985 TOP work session. Final editing and polishing was left in the hands of the coordinator at CRDG.

The PICES simulation was compiled in draft form in 1984. However, mechanical difficulties with the program have shelved that part of the curriculum until after the publication of the generalizing/international component.

## International Component Publication Stage

The common generalizing/international Pacific Fisheries: Environment, Economics, Politics and Cooperation book series is at this writing in the process of publication. This is being done jointly by the media divisions of CRDG and CDC. The materials will be available to each of the contributing agencies for dissemination to their local school district in late 1986.

## PROBLEMS

A series of problems were confronted during the course of the development of the materials. Some were resolved, some were not. These problems will be discussed under the following headings, funding, content, differences in education organization, communication, changing personnel, agency impatience, and translation. Though this list may appear long, the participants goodwill, enthusiasm, and conviction that success was possible reduced their impact.

## Funding

From the beginning, funding of TOP was a problem. Substantial efforts were made by the PCC leadership to find external support for TOP. The Center for Educational Innovation and Research served only a parenting role leaving funding to the charter agencies. On analysis, the scope of the prospective TOP project was wider than most education oriented eleemosynary institutions normally found, and the idea of producing a common curriculum seemed to many who have worked in the European arena as a target of impossibility.

For a consortium of organizations accustomed to fueling development activities with external monies, the next step in decision was a bold one. After reviewing institutional assets and interests it became apparent that with the kindling of a few airline tickets the project could be sustained out of institutional resources. Each institution agreed to support its team members and wherever possible to contribute to travel costs. Because of its centrality Hawaii became the site of the annual joint work session. CRDG because of certain flexibilities in its fiscal policy was able to provide additional air tickets where necessary. The funding sources for each team is shown in Figure 2.

| | WORK SESSIONS | | | | | |
|---|---|---|---|---|---|---|
| TEAM | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 |
| AUSTRALIA (1) | CDC | CDC | CDC | CDC | CDC | CDC |
| JAPAN (1) | NIER<br>HIR U. | NIER<br>HIR. U. | NIER<br>HIR. U. | HIR. U. | HIR U.<br>CRDG | |
| NEW ZEALAND (1) | NZDOE | NZDOE | NZDOE | NZDOE | NZDOE<br>CRDG | |
| ALASKA (1) | ADOE | ADOE | ADOE | ADOE | ADOE | |
| HAWAII (2) | CRDG | CRDG | CRDG | CRDG | CRDG | CRDG |
| OREGON/<br>WASHINGTON (3) | NWRL | CRDG<br>OFW<br>BSD<br>SSC | CRDG<br>OFW<br>BSD<br>SSC | CRDG<br>OFW<br>BSD<br>SSC | CRDG<br>OFW<br>BSD<br>SSC | |

Figure 2. Funding sources for each year of the project. Numbers in parentheses refer to the number of persons from each team attending the Honolulu work sessions. Institutional teams were generally larger than the representation at the work session. Alaska contracted out the development of its local materials, Australia employed three writers, the New Zealand writing team had three members, and the Japanese team employed a group of teacher associates.

| | |
|---|---|
| ADOE | Alaskan Department of Education, Anchorage, Alaska |
| BSD | Beverton School District, Beverton, Oregon |
| CDC | Curriculum Development Center, Cambara, Australia |
| CRDG | Curriculum Research and Development Group, Honolulu, Hawaii |
| HIR. U. | Hiroshima University, Hiroshima, Japan |
| NIER | National Institute of Educational Research, Tokyo, Japan |
| NWRL | North West Regional Laboratory, Portland, Oregon |
| NZDOE | New Zealand Department of Education, Wellington, New Zealand |
| SSC | Seattle Science Center, Seattle, Washington |

## Content

Due to pre-existing needs for materials that reflect the national and regional conditions of fisheries in New Zealand and Alaska, it became immediately apparent that the structure of the final product would have to provide for both local and international content. This resulted in the dual strand structure shown above.

More difficult was the decision on what topics would be sufficiently universal for all groups to organize instruction. By reviewing the practical consideration of the probable amount of time that schools in each region could spend on fisheries topics, four units of organization was arrived at. It was the concensus of the group that students need to know something of the ocean environment to understand the problems and economics of fishing, this organized chapters 1 and 2. For purposes of enhancing international understanding the last two chapters devoted to conflicts and management were considered essential to give closure and sense of the new hope for international cooperation that is inherent in the Law of the Sea.

Three subthemes pervade the materials. The first speaks to the fragility, yet bounty of the marine environment. It tells a story of how the oceans productivity can be markedly decreased by unwise and uncaring use and conversely enhanced by wise and caring use. The second, brings out the differential reliance of the nations of the Pacific on the ocean as a source of food stuff. It particularly points up the Japanese and other Asian communities dependence on the oceans for a major proportion of their dietary protein and consequent governmental and private sector practices. Third it focuses on the need for cooperation, both at a local and international level if the resources of the sea are to be successfully managed for this generation and generations to come.

## Differences in Educational Organization

Teams from each of the four nations involved in the project worked within different kinds of educational organizations. This operational fact had a direct bearing on the audiences for which the materials were designed. Japan, for instance, has a centrally established syllabus which is revised only occasionally. Materials used in regular Japanese schools must fit that syllabus and therefore the materials envisioned for the project could not be used as part of their regular curriculum. However, there does exist a group of experimental and special schools where new materials can be developed and tried and it was with these schools that the Hiroshima team found collaboration.

New Zealand was able to find a locus for the materials in its newly authorized 11th year geography course. Adjustment of the 12th year examination will be made at a later date. Australia also found the topic of fisheries acceptable within the existing syllabi of most of its states and concluded that any new materials could be readily incorporated into their social studies curriculum.

Teams from the United States reported a wide variety of practices. Alaska had already designated fisheries studies to be part of its curriculm. Reports from Oregon and Washington indicated that any materials would be acceptable to at least some of the schools in these states. Hawaii, however, has a state controlled curriculum and could fit the materials only into its 11th grade elective program.

This diversity of educational organization points to a need to be sure that from the beginning that the cooperating institutions have a clear picture of both the long and short term prospects for final dissemination. Membership in a curriculum effort might well use as its first screen of potential participants the degree to which there is a match in school populations that can be served and the conditions that must be met to provide that service.

Communication

It was naively assumed that during the course of work, new telecommunication techniques would permit frequent contacts between team members. Contacts were made using the "no charge" PEACESAT system, however, because of changes in the footprint of this West moving satellite, it was necessary to use it in conjunction with commercial telephone. As a result, the system became too expensive to bare the frequent use originally anticipated. Other problems including, poor circuit quality and non-simultaneous transmission on the system made even these attempts at telecommunication less than satisfactory. For various reasons the Japanese team was never able to join in on the conversations that were held.

In frustration, the project resorted to using time proven mail service, though even this had tremendous problems. Strikes by postal employees, and other uncertainties of international mail often delayed materials up to a month. We found the only way of insuring quick receipt of materials was to use relatively expensive courier services. As a result, much communication was simply delayed until the annual work sessions.

Change in Personnel

During the course of the project several of the teams, Hawaii, Australia, and Japan had personnel changes. Every team change cost the project time in re-orienting newcomers. In a closely knit group which relies on shared common knowledge, goodwill, and interpersonal commitment, each loss of an established member required new orientation and group bonding. Changes in personnel added possibly as much as a year to the completion time of the project.

The problem of personnel change will in all probability plague any international curriculum effort that is not completed at a single sitting. The TOP experience suggests that in the early stages of time line development, changes in the makeup of the working membership must be anticipated.

Agency Impatience

One of the main problems that faced the project members was impatience on the part of their institutional administrators to complete the task. The process

seemed slow to some. Much of the project coordinator's time was spent in crafting reports to agencies and providing justification for slipping time line projections. In retrospect, it probably was not the slowness of production that was at the root of the concern, but the nagging question, "can the project be completed?"

## Language of Communication and Translation

Only the Japanese team members were non-native English speakers. Fortunately both representatives from Japan had a good command of English and were able to freely interact with the group and their contributions to the shape of the project were substantial. However, the translation of materials developed in Japanese schools for the project were a strain on that team and on the support of their sponsoring institutions. Though the problems associated with translation of materials has not been solved in this project, it would seem reasonable in the future that development should be completed in one agreed upon language with translation of common materials done only after completion of the project. Multiple interim translations are quite unrealistic for a project with budgetary limitations.

## RUMINATIONS

The Ocean Fishing Project has demonstrated that multinational curriculum can be designed and carried out to a publication phase. Certainly the costs for such work seem comparable to the most modest projects undertaken by these educational agencies and has the added advantage of international validation of content.

The flexible model employed for organizatin of materials which allows for both local and international content seems to have satisfied the needs of the participants in TOP. This same model may well apply to other areas of the curriculum.

Any success in later dissemination of materials will have to rely on the stature of the local agencies that have contributed to development of the materials and how well they have read the local market. It should be noted that if materials are to be created for relatively closed systems such as Japan's that the process for their adoption will be long; that in their first written state such materials can only offer a prototype which if seen as successful can potentially give direction in new syllabus writing.

The importance of the right personnel mix cannot be overemphasized. The project was most fortunate in the careful consideration that was given by institutions in the selection of personnel. Had this not been so, the project could have been drastically delayed.

## EPILOGUE

It is the general consensus of the sponsoring institutions that the first TOP projects have pointed the way to a new mechanism for cooperative development of curriculum. At this writing, preparations for a second round of TOP

projects are being made and a launching conference will be held in Auckland, New Zealand in August of 1986. The overarching theme will be endangered ecosystems.

Now that the first TOP materials are going into dissemination; it is hoped that other groups can be involved in testing their effectiveness. A range of cross cultural research questions emerge including studies of: student response to the generalizing/international component; teacher's and student's preference for the local versus international components; perception changes concerning international cooperation; the problems of teachers in using international materials; and numerous others. PCC is in a position to facilitate professional research on its projects and is open to proposal.